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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/525,737

02/28/2005

Naoki Suehiro

052159

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7590

09/03/2009

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EXAMINER

FLORES, LEON

ART UNIT

PAPER NUMBER

2611

NOTIFICATION DATE

DELIVERY MODE

09/03/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/525,737	<b>Applicant(s)</b> SUEHIRO, NAOKI	
	<b>Examiner</b> LEON FLORES	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Response to Arguments***

1. Applicant's arguments with respect to claims (1-9) have been considered but are moot in view of the new ground(s) of rejection.

Applicant asserts that *"it appears that the Examiner has cited an incorrect test to determine eligible subject matter under 35 U.S.C. § 101. The correct test under Bilski is the machine or transformation test. An applicant may show that a process claim satisfies § 101 either by showing his claim is tied to a particular machine, or by showing that his claim transforms an article"*.

The examiner respectfully disagrees. Claim 1 fails to explicitly teach what apparatus is implementing the steps of producing this signal. Moreover, the claim does not recite any apparatus being tied to this implementation. However, based on applicant's arguments that, "claim 1 clearly transforms an article. Specifically, the claim encompasses a transmission method involving the transforming steps of using several sequences and, through repetition and cutting, produces a plurality of finite-length signals. The original signals (A, B, X, and Y) undergo a transformation and result in the production of a plurality of finite-length signals (SA,x, SB.v ,...)", the examiner has withdrawn the 101 rejection.

Applicant further asserts that *"Section 4.2 of the Suehiro reference relates to an information transmission method which indicates that the transmitted signal is represented by equation (7). However, while equation (7) may include 0s in the*

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*transmitted signal, the 0s are not of a predetermined length added between the plurality of transmission data".*

The examiner respectfully disagrees. As stated in the previous rejection dated 2/18/2009, the reference of Suehiro, who is the same person as in the present application, does suggest the transmission data sequences of claim 1 having a data structure wherein a plurality of transmission data are arranged with 0 data of a predetermined length added between the plurality of the transmission data. (See sections 1-4. Especially section 4.2, equation 7) Furthermore, from equation 7 one can conclude that the length of the 0 data is of predetermined length. (See number of 0 data is always the same for each time shifted signals.) Moreover, equation 7 also teaches that the data is carried by the chip-shifted signals with 0 data of predetermined length in between each of the signals. And this is exactly what applicant discloses in his specification. (See fig. 1) However, taking the contrary, it is inherent that the 0 data is of predetermined length since we are dealing with band limited signals.

Applicant further asserts that *"the Examiner's characterization of Taub as the excerpt cited by the Examiner concerns the sampling theorem as related to low-pass signals. The sampling theorem involves, in general, taking samples of signals periodically every  $T_s$  seconds where  $T_s$  is the sampling time and then multiplying the sampled signals by the sinc function to shift and scale the sampled signal. The Taub reference does not teach or fairly suggest the use of guard bands in a signal such as those of the Suehiro reference"*.

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The examiner respectfully disagrees. The purpose of Taub was to only illustrate that the concept of inserting 0 data in between data signals is an inherent feature in communication systems. And this is mainly done in order to preclude inter-symbol interference. However, taking the contrary, a new ground of rejection has been issued in order to address the limitation of the 0 data.

Applicant finally asserts that *“even if Suehiro and Taub were to be combined, there is no support for the Examiner's assertion that the resulting signal would be that of claim 1. The addition of the guard bands of Taub would fundamentally change the signals of the Suehiro reference. Neither reference provides a reasonable expectation that signal resulting from the combination of Suehiro and Taub would resemble or function the same as the signals of claim 1”*.

The examiner respectfully disagrees. The purpose of Taub was to only illustrate that the concept of inserting 0 data in between data signals is an inherent feature in communication systems. And this is mainly done in order to preclude inter-symbol interference. However, taking the contrary, a new ground of rejection has been issued in order to address the limitation of the 0 data.

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***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**1. Claims (1-9) are rejected under 35 U.S.C. 103(a) as being unpatentable over Naoki Suehiro et al. (hereinafter Suehiro), “Very Efficient Wireless Frequency Usage by Coherent Addition of Multipath Signals Using ZCCZ Sequence Set”, Graduate School of Systems and Information Engineering, July 2002 for the same reasons as set forth in the last office action.**

Re claim 1, Suehiro discloses a transmission method comprising the steps of:  
using a plurality of data sequences

$$A = \{a_0, a_1, \dots, a_{N-1}\}, B = \{b_0, b_1, \dots, b_{N-1}\}, \dots$$

(Section 3 equation 1)

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and a plurality of coefficient sequences

$$X = (x_0, x_1, \dots, x_{N-1}), Y = (y_0, y_1, \dots, y_{N-1}), \dots, i$$

(See sections 2 "X and Y", and section 3 equation 1)

But the reference of Suehiro fails to explicitly teach  
producing a plurality of finite-length signals of a length Nm

$$S_{0,x} = (x_0A, 0\dots 0, x_1A, 0\dots 0, x_2A, 0\dots 0, \dots, x_{N-1}A, 0\dots 0) \\ S_{0,y} = (y_0B, 0\dots 0, y_1B, 0\dots 0, y_2B, 0\dots 0, \dots, y_{N-1}B, 0\dots 0)$$

(0...0 indicates a null time of a predetermined length where no signal is generated)

repeating each finite-length signal of said finite-length signals

$$S_{0,x}, S_{0,y}, \dots$$

to produce a pseudo periodic signal

$$\dots S_{0,x}, S_{0,y}, S_{0,x}, S_{0,y}, \dots S_{0,x}, S_{0,y}, S_{0,x}, S_{0,y}, \dots i$$

and cutting out a part from said pseudo periodic signal to produce a signal of a  
predetermined length longer than Nm for making said signal a transmission signal.

However, the reference of Suehiro does suggest producing a plurality of finite-  
length signals of a length Nm

$$S_{0,x} = (x_0A, 0\dots 0, x_1A, 0\dots 0, x_2A, 0\dots 0, \dots, x_{N-1}A, 0\dots 0) \\ S_{0,y} = (y_0B, 0\dots 0, y_1B, 0\dots 0, y_2B, 0\dots 0, \dots, y_{N-1}B, 0\dots 0)$$

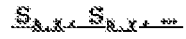
(See equations 1 & 7)

(0...0 indicates a null time of a predetermined length where no signal is generated)

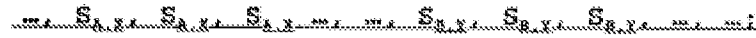
(See number of 0 data is always the same for each time shifted signals. Moreover,  
equation 7 also teaches that the data is carried by the chip-shifted signals with 0 data of  
predetermined length in between each of the signals.)

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repeating each finite-length signal of said finite-length signals



to produce a pseudo periodic signal



and cutting out a part from said pseudo periodic signal to produce a signal of a predetermined length longer than  $Nm$  for making said signal a transmission signal. (See sections 2-4 "A" is produced using the repeated sequence (...AAAA...))

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Suehiro, in the manner as claimed, for the benefit of mitigating the effects of intersymbol interference.

Re claim 2, the reference of Suehiro further discloses the step of adding up a plurality of signals of a predetermined length, cut out from the pseudo periodic signal produced from different finite-length signals, to produce a transmission signal. (See section 4)

Re claim 3, the reference of Suehiro further discloses that wherein a plurality of transmission signals are produced using different coefficient sequences and in an arbitrary combination of said plurality of transmission signals, a periodic cross-coefficient function of the transmission data of said transmission data sequences is 0 for all shifts. (See section 2)



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Re claim 4, the reference of Suehiro further discloses that wherein a plurality of transmission signals are produced using different coefficient sequences and in an arbitrary combination of said plurality of transmission data sequences, the plurality of transmission signals are transmitted in parallel so that periodic spectrums of the transmission signals have no correlation. (See section 2)

Re claim 5, the reference of Suehiro further discloses that wherein said coefficient sequence is a row vector of a DFT matrix. (See section 2)

Re claim 6, the reference of Suehiro further discloses a communication method comprising the steps of: transmitting the transmission signal according to claim 1 or 2; and receiving said transmission signal and outputting a data sequence via a matched filter corresponding to said coefficient sequence. (See section 4)

Re claim 7, the reference of Suehiro further discloses that wherein at least one transmission signal selected from said transmission signals is used as a pilot signal for measuring multi-path characteristics, and the received signal has multi-path characteristics of a transmission path. (See section 4)

Re claim 8, the reference of Suehiro further discloses that wherein a plurality of transmission signals are produced using different coefficient sequences of a spreading sequence and at least one transmission data sequence selected from said transmission

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data sequences is used as the pilot signal with other transmission signals used as transmission signals, further comprising the steps of: finding multi-path characteristics from the reception signal of the pilot signal; and removing the multi-path characteristics from the reception signal of the transmission signal using the multi-path characteristics, which are found, to produce a data sequence. (See sections 1 & 4.2)

Claim 9 has been analyzed and rejected w/r to claim 1 above.

### ***Conclusion***

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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***Contact***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON FLORES whose telephone number is (571)270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. F./

Examiner, Art Unit 2611

July 22, 2009

/Mohammad H Ghayour/

Supervisory Patent Examiner, Art Unit 2611

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